

Serial No. 10/734,803  
Page 9 of 13

RECEIVED  
CENTRAL FAX CENTER

JAN 08 2007

**Remarks**

Claims 1-21 are pending in the application.

Claim 14 is rejected under 35 U.S.C. 112, ¶1, as failing to comply with the written description requirement.

Claims 1-4, 9-13 and 15-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ciaramella et al. ("Ciaramella") ("Fast tunable wavelength conversion for all-optical packet switching"; Ciaramella et al.; Photonics Technology Letters, IEEE; Volume 12, Issue 10, Oct. 2000, Pages: 1361-1363).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ciaramella.

Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or is simply clearer and easier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Also, since a dependent claim inherently includes the recitations of the claim or chain of claims from which it depends, it is submitted that the scope and content of any dependent claims that have been herein rewritten in independent form is exactly the same as the scope and content of those claims prior to having been rewritten in independent form. That is, although by convention such rewritten claims are labeled herein as having

Serial No. 10/734,803

Page 10 of 13

been "amended," it is submitted that only the format, and not the content, of these claims has been changed. This is true whether a dependent claim has been rewritten to expressly include the limitations of those claims on which it formerly depended or whether an independent claim has been rewritten to include the limitations of claims that previously depended from it. Thus, by such rewriting no equivalent of any subject matter of the original dependent claim is intended to be surrendered. If the Examiner is of a different view, he is respectfully requested to so indicate.

#### Amendment to the Specification

The specification has been amended to clarify certain terminologies. Specifically, the symbol  $\chi^2$  has been amended to read  $\chi^{(3)}$  in the paragraph starting on page 5, line 9. The word "second-order" has also been amended to read "third-order" in the paragraphs starting on page 3, line 19; page 3, line 31; page 5, line 9; page 5, line 27; and page 6, line 31 to provide consistent terminologies.

These amendments are needed to correct an inadvertent typographical error relating to the non-linear susceptibility  $\chi^{(3)}$ , and to avoid potential confusion. As one skilled in the art would understand from reading Applicants' specification, the non-linear susceptibility relevant to the parametric processes described herein is  $\chi^{(3)}$  (not  $\chi^2$ ), which is more commonly referred to as a third-order nonlinearity. No new matter has been added as a result of these amendments.

Entry of these amendments is respectfully requested.

#### Rejection Under 35 U.S.C. 112, First Paragraph

Claim 14 is rejected under 35 U.S.C. 112, ¶1, as failing to comply with the written description requirement. The Office Action states that "the specification supports converting an original single wavelength into multiple other single-wavelength replicas of the original single wavelength, but does not support converting a single wavelength into multi-band optical signals."

Applicants have amended claim 14 to further clarify the invention. Specifically, claim 14 now recites "wherein each wavelength of said input data signal is converted into a corresponding wavelength in said respective generated optical bands." Support for this

Serial No. 10/734,803

Page 11 of 13

can be found, for example, in Figure 2 of the original specification. As such, no new matter has been added.

Applicants request that the rejection under 35 U.S.C. 112, ¶1 be withdrawn.

#### **Rejection Under 35 U.S.C. 102**

Claims 1-4, 9-13 and 15-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Ciaramella. The rejection is traversed.

The term "second-order" in claims 1, 10, 18 and 20 has been amended to read "third-order", as consistent with the terminology in the amended specification set forth above.

Applicants have also amended claim 1 to further clarify Applicants' invention. The amended claim 1 recites, in part: "a first optical combiner for combining at least two optical pump signals to produce a combined pump signal, and a second optical combiner for combining an input data signal with the combined pump signal to produce a combined signal". This is supported in Applicants' original specification, e.g., Fig. 1. As such, no new matter has been added as a result of this amendment.

Claim 16 has been amended to provide consistent terminology with amended claim 1, and independent claim 18 has been amended with features similar to claim 1 to clarify Applicants' invention.

Applicants submit that the above features in amended claim 1 are not taught by Ciaramella. Specifically, Ciaramella's Fig. 2 shows an input data signal being combined with a single pump signal (P1) in a coupler, and this combined "pump-data" signal is then combined in a polarization beam splitter (PBS) with a pump signal from either pump 2 or pump 3 ("P2 are P3 alternatively switched on or off", Ciaramella, p.1362, left column).

Thus, unlike Applicants' invention, the two pump beams in Ciaramella are not combined in one combiner prior to being combined in a second combiner with the data signal. This specific configuration and order of combining the beams is used in Ciaramella in order to overcome an undesirable feature of four-wave mixing (FWM) such as an intrinsic dependency on the conversion interval, i.e., changes in conversion efficiency as a function of the orthogonal pump P2 or P3 signal wavelength (see, e.g., Ciaramella, p.1361, right column).

Serial No. 10/734,803

Page 12 of 13

Since Ciaramella does not teach combining the signal and pump beams in the manner as arranged in Applicants' amended claim 1 and 18, these claims are not anticipated by Ciaramella.

Since all of the dependent claims that depend from the independent claims include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Ciaramella. under 35 U.S.C. 102.

Therefore, the rejection should be withdrawn.

#### **Rejection Under 35 U.S.C. 103(a)**

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ciaramella in view of Dasylyva et al. ("Dasylyva") (US Patent Application Publication No. 2002/0118415). The rejection is traversed.

This ground of rejection applies only to a dependent claim, and is predicated on the validity of the rejection under 35 U.S.C. 102 given Ciaramella. Since the rejection under 35 U.S.C. 102 given Ciaramella has been overcome, as described hereinabove, and there is no argument put forth by the Office Action that Dasylyva. supplies that which is missing from Ciaramella. to render the independent claims anticipated, this ground of rejection cannot be maintained.

Therefore, the rejection should be withdrawn.

#### **Allowable Subject Matter**

Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicants thank Examiner for indicating the allowable subject matter in claims 5-7. However, for at least the reasons set forth above, the amended claim 1 is patentable under 35 U.S.C. 102 over Ciaramella.

Since claims 5-7 depend from claim 1 and recite additional features thereof, Applicants submit that these claims are also patentable over Ciaramella in their present dependent form.

Therefore, the objection should be withdrawn.

Serial No. 10/734,803  
Page 13 of 13

RECEIVED  
CENTRAL FAX CENTER

JAN 08 2007

Secondary References

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to Applicants' disclosure than the primary references cited in the Office Action. Therefore, Applicants believe that a detailed discussion of the secondary references is not necessary for a full and complete response to this Office Action.

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, the Examiner is invited to call Eamon Wall at (732) 530-9404 so that arrangements may be made to discuss and resolve any such issues.

Respectfully submitted,

Dated: 1/8/07

E J Wall  
Eamon J. Wall  
Registration No. 39,414  
Attorney for Applicants

PATTERSON & SHERIDAN, LLP  
595 Shrewsbury Avenue, Suite 100  
Shrewsbury, New Jersey 07702  
Telephone: 732-530-9404  
Facsimile: 732-530-9808